

Inventor: Kardokus et al.

Title: Methods of Forming Copper-Containing Sputtering Targets

Assignee: Honeywell International, Inc.

Attorney Docket No. JM34006DIV



**INFORMATION DISCLOSURE STATEMENT**

**PURSUANT TO 37 C.F.R. §§ 1.56, 1.97 AND 1.98**

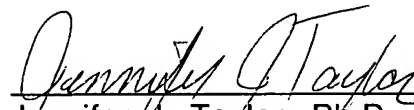
In compliance with 37 C.F.R. §§ 1.56, 1.97 and 1.98, your attention is directed to the United States patents and other references listed on the attached Form PTO-1449. No admission is made regarding whether all the submitted references are prior art.

The listed references were cited by, or submitted to, the Office in the parent, co-pending application of the above-identified application. The above-identified application is a divisional application of co-pending application Serial No. 09/714,714, filed November 15, 2000. Such prior disclosure is sufficient for the above-identified application as far as copies of the references are concerned. 37 C.F.R. § 1.98(d) and MPEP § 609(2).

Citation of these references is respectfully requested.

Respectfully submitted,

Dated: December 19, 2001

  
Jennifer J. Taylor, Ph.D.  
Reg. No. 48,711

Form PTO-1449

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICEATTY. DOCKET NO.  
JM34006DIVPriority SERIAL NO.  
09/714,714LIST OF ART CITED BY APPLICANT  
(Use several sheets if necessary)APPLICANT  
Janine K. Kardokus et al.Priority FILING DATE  
November 15, 2000Priority GROUP  
1742

## U.S. PATENT DOCUMENTS

*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
	AA	3,963,934	06/76	Ormrod			
	AB	4,132,614	01/79	Cuomo et al.			
	AC	4,149,907	04/79	Wronski et al.			
	AD	4,159,909	07/79	Wilson			
	AE	4,198,283	04/80	Class et al.			
	AF	4,209,375	06/80	Gates et al.			
	AG	4,385,979	05/83	Pierce et al.			
	AH	4,545,882	10/85	McKelvey			
	AI	4,629,859	12/86	Reddy			
	AJ	4,814,053	03/89	Shimokawato			
	AK	5,171,411	12/92	Hillendahl et al.			
	AL	5,215,639	06/93	Boys			

## FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
	AM	0335383 A2	10/89	EPO				
	AN	0626722 A1	11/94	EPO				
	AO	0882813 A1	12/98	EPO				
	AP	01096374	04/89	Japan				
	AQ	01096376	10/87	Japan				

## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)

	AR		Physical Metallurgy Principles 2d ed., 1973, p. 298.
	AS		Phillips, V.A. et al., "The Effect of Certain Solute Elements on the Recrystallization of Copper", Journ. of Institute of Metals, Vol. 81, 1952-53, pp. 185-208.
	AT		Brizzolara et al., "Low Energy Sputtering of Eutectic Ag/Cu Alloys", Nuclear Instruments and Methods in Physics Research B26, 1987, pp. 528-531.

EXAMINER

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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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U.S. PATENT DOCUMENTS							
*Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate	
	AA	5,242,566	Parker				
	AB	5,268,236	Dumont et al.				
	AC	5,282,943	Lannutti et al.				
	AD	5,282,946	Kinoshita et al.				
	AE	5,336,386	Marx et al.				
	AF	5,397,050	Mueller				
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	AK	5,833,823	Gruenenfelder et al.				
	AL	5,846,389	Levine et al.				

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Document Number	Date	Country	Class	Subclass	Translation		
					Yes	No	
AM	02301585	12/13/90	Japan				
AN	05078195	3/30/93	Japan				
AO	06081138	01/03/94	Japan				
AP	09249967	09/22/97	Japan				
AQ	10287939	10/27/98	Japan				

OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)			
	AR		Cabral, C. et al., "Preparation of Low Resistivity Cu-I at. %Cr Thin Films by Magnetron Sputtering", J. Vac. Sci. Technol. A 10(4), Jul/Aug 1992, pp. 1706-1711.
	AS		Foster, N., "Composition and Structure of Sputtered Films of Ferroelectric Niobates", J. of Vac. Sci. and Tech., Vol. 8, No. 1, (1971), pp. 251-255.
	AT		Haertling, G., "Hot-Pressed Ferroelectric Lead Zirconate Titanate Ceramics for Electro-Optical Applications", Ceramic Bulletin, Vol. 49, No. 6 (1970), pp. 564-567.

EXAMINER	DATE CONSIDERED
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U.S. PATENT DOCUMENTS						
*Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
	AA	6,010,583	01/00	Annarapu et al.		
	AB	6,028,003	02/00	Frisa et al.		
	AC	6,039,855	03/00	Wollenberg		
	AD	6,042,752	03/00	Mitsui		
	AE	6,068,742	05/00	Daxinger et al.		
	AF	6,086,735	07/00	Gilman et al.		
	AG	6,117,281	09/00	Novbakhtian.		
	AH	6,139,701	10/00	Pavate et al.		
	AI	5,693,203	12/97	Ohhashi et al.		
	AJ	6,113,761	09/00	Kardokus et al.		
	AK	3,666,666	05/72	Haertling		
	AL	3,923,675	12/75	Mazdiyasi et al.		
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	Document Number	Date	Country	Class	Subclass	Translation Yes      No
	AM	61084389	4/28/86	Japan		
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	AO	62127438	6/9/87	Japan		
	AP	63064211	3/22/88	Japan		
	AQ	63118033	5/23/88	Japan		
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	AR	Harper, J. et al., "Materials Issues in Copper Interconnections", MRS Bulletin, Aug. 1994, pp. 23-29.				
	AS	Igarashi, Y. et al., "Electromigration Properties of Copper-Zirconium Alloy Interconnects", J. Vac. Sci. Technol. B 16(5), Sep/Oct. 1998, pp. 2745-2750.				
	AT	Dierckxsens et al., "Effect of Trace Elements On the Recrystallization Behavior of High Purity Oxygen-Containing Copper", Erzmetall, (1975), 28(11), 496-500 (abstract only)				
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	AB	4,814,053	03/89	Shimokawato			
	AC	4,986,856	01/91	Tanigawa et al.			
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	AE	5,066,617	11/91	Tanemoto et al.			
	AF	5,077,005	12/91	Kato			
	AG	5,314,651	05/94	Kulwicki			
	AH	5,719,447	02/98	Gardner			
	AI	5,833,820	11/98	Dubin			
	AJ	5,895,562	04/99	Dubin			
	AK	5,972,192	10/99	Dubin et al.			
	AL	6,093,966	07/00	Venkatraman et al.			
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	AO	00/73531 A2	12/7/00				
	AP						
	AQ						
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	AR		Massalski, T., "Binary Alloy Phase Diagrams", Vol. 1, American Society for Metals, Ohio 1986, pp. 18-19, 928-929, 936-937, 964-965.				
	AS		West, C., "International Critical Tables of Numerical Data, Physics, Chemistry and Technology", National Research Council of the USA, McGraw-Hill Book Co., Inc. 1933, 6 pages.				
	AT		Pierson, K. et al., "Total Sputtering Yield of Ag/Cu Alloys for Low Energy Argon Ions", Nucl. Instrum. Methods Phys. Res., Sect. B (1996), Vol. 108(3), pp. 290-299.				
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	AD	6,121,150	09/00	Avanzino et al.			
	AE	6,121,685	09/00	Gardner			
	AF	6,162,726	12/00	Dubin			
	AG	6,197,433	03/01	Hatano			
	AH						
	AI						
	AJ						
	AK						
	AL						
FOREIGN PATENT DOCUMENTS							
		Document Number	Date	Country	Class	Subclass	Translation Yes    No
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	AO						
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OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)							
	AR		Rossnagel, S., "Direction and Preferential Sputtering-Based Physical Vapor Deposition", Thin Solid Films 263 (1995), pp. 1-12.				
	AS		Takewaki, T. et al., "Excellent Electro/Stress-Migration-Resistance Surface-Silicide Passivated Giant-Grain Cu-Mg Alloy Interconnect Technology for Giga Scale Integrations (GSI)", 1995 IEEE, pp. 10.5.1 - 10.5.4.				
	AT						
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